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EXAMINER

LEE, SIN J

ART UNIT

PAPER NUMBER

1752

DATE MAILED: 08/25/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicant(s) N .

09/995,921

Examiner

Sin J Lee

Applicant(s)

KOES ET AL.

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-11 and 13-20 is/are rejected.
- 7) ☒ Claim(s) 4 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5, 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In claim 3, applicants recite "... Z is aryl, -C(Y)-R¹ or -O-C(Y)-R¹." However, Z in present claim 1 cannot be -O-C(Y)-R¹.
2. Claim 4 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. None of those compounds listed in claim 4 meets the present formula of claim 1 (in order for those compounds to meet the formula, present Z of claim 1 needs to be -O-C(Y)-R¹).
3. Claim 11 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In claim 9, applicants recite "... Z is aryl, -C(Y)-R¹ or -O-C(Y)-R¹." However, Z in present claim 9 cannot be -O-

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C(Y)-R¹. Also, applicants need to insert --- R --- between "wherein" and "is phenyl or alkenyl".

4. Claim 12 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. None of those compounds listed in claim 12 meets the present formula of claim 9, from which claim 11 depend (in order for those compounds to meet the formula, present Z of claim 9 needs to be -O-C(Y)-R¹).

5. Claim 15 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In claim 15, applicants recite "... Z is aryl, -C(Y)-R¹ or -O-C(Y)-R¹". However, present Z of claim 13 cannot be -O-C(Y)-R¹.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 13-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claim 13 recites the limitation "wherein *the organic acid* is non-polymerizable . . ." in line 4. There is insufficient antecedent basis for this limitation in the claim. For the purpose of examining the claim on the merit, the Examiner assumed that applicants meant to say "wherein the photoresist strip enhancer is non-polymerizable . . .".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-3, 5-11, and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamazaki et al (4,065,315).

In Example 4, Yamazaki teaches a photosensitive composition comprising a copolymer of styrene and methacrylic acid (a polymeric binder), *benzophenone* (present photoactive component of claim 5), and trichloroacetamide. Furthermore, Yamazaki teaches the trichloroacetamide to be interchangeable with 1,1,1-trichloro-2,2-bis (parachlorophenyl)ethane (which chemical structure is $(\text{Cl-C}_6\text{H}_4)_2\text{C}(\text{H})(\text{CCl}_3)$) as his halogen containing compound that release halide free radicals upon exposure to actinic radiation (see col.8, lines 36-63 and col.17, lines 10-40). Because the prior art teaches the trichloroacetamide to be interchangeable with 1,1,1-trichloro-2,2-bis

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(parachlorophenyl)ethane, it is the Examiner's position that one of ordinary skill in the art would immediately envisage using the latter in Yamazaki's Example 4. The 1,1,1-trichloro-2,2-bis (parachlorophenyl)ethane, $(\text{Cl-C}_6\text{H}_4)_2\text{C}(\text{H})(\text{CCl}_3)$, teaches present formula of claims 1, 9, and 13 because in the present formula, X can all be chlorine atoms, and R and Z both can be a substituted aryl group (the chlorine-substituted *phenyl group* is a substituted aryl group). Since the prior art teaches the compound of present formula, it is the Examiner's position that Yamazaki's 1,1,1-trichloro-2,2-bis (parachlorophenyl)ethane would inherently be non-polymerizable with the polymeric binder as presently recited. In Example 4, Yamazaki laminates his photosensitive composition-contained resist coating to a clean copper clad, epoxy-fiberglass board (present printed wiring board substrate), exposes the copper clad board imagewise and then develops the exposed resist layer in 2% trisodium phosphate in water to obtain a resist pattern. Finally, the resist is removed from the remaining copper by dipping for 2 minutes in a 3% solution of sodium hydroxide in water to give a high quality printed circuit board. Therefore, the prior art teaches present inventions of claims 1-3, 5, 9-11, and 13-15.

With respect to present claims 6 and 7, present specification (pg.10, first full paragraph) states that the polymeric binders contain sufficient acid functionality to render the binder polymers soluble and removable upon development and that the term "acid functionality" refers to any functionality (including carboxylic acids) capable of forming a salt upon contact with alkaline developer, such as dilute alkaline aqueous sodium or potassium hydroxide, e.g., 1-3 wt% solutions and that in general, the binder

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polymer typically has an acid number of about 50 to 250. Since Yamazaki uses a polymeric binder which contains the carboxylic acid functionality and since Yamazaki also uses the dilute alkaline developer for developing and removing the resist, it is the Examiner's position that the prior art inherently teaches present inventions of claims 6 and 7.

With respect to present claim 8, Yamazaki uses 1.5 parts by weight of the halogen-containing compound that release halide free radicals upon exposure to actinic radiation, and thus the prior art teaches present invention of claim 8.

10. Claims 16-18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Taniguchi et al (4,889,793).

In Example 5, Taniguchi teaches a photosensitive composition containing polyamide (*a polymeric binder*), benzil methyl ketal (*a photoactive component*), hydroquinone, 50 parts of *caprolactone-modified 2-hydroxyethyl methacrylate*, 5 parts of *trimethylolpropane triacrylate (TMPTA)*, and ethylene oxide-modified phthaloyl acrylate. Taniguchi et al teaches that caprolactone-modified 2-hydroxyethyl *methacrylate* and caprolactone-modified 2-hydroxyethyl *acrylate* are interchangeable in their invention (see col.4, lines 25-28 and also Example 1 where caprolactone-modified 2-hydroxyethyl acrylate is being used). Because the prior art teaches that caprolactone-modified 2-hydroxyethyl *methacrylate* and caprolactone-modified 2-hydroxyethyl *acrylate* are equivalent or interchangeable for its invention, one of ordinary skill in the art would immediately envisage using caprolactone-modified 2-hydroxyethyl *acrylate* in Taniguchi's Example 5. According to present specification (pg.13, last paragraph,

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pg.14, lines 1-10, pg.14, last paragraph, pg.15, lines 1-6), the combination of TMPTA (a triacrylate crosslinking agent) and the caprolactone-modified 2-hydroxyethyl *acrylate* (non-crosslinkable acrylate monomer) is a preferred example for the present curing agent system having the net acrylate functionality of about 2. Therefore, Taniguchi et al teach present inventions of claims 16-18 and 20. Since the prior art teaches present step cited in present claim 16, it is the Examiner's position that the prior art's step would inherently enhance the removal of its photosensitive composition from its polyester film substrate.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoh et al (5,821,016).

Satoh et al teach (see col.3, lines 14-67) a colored image forming material (A), which comprises a copolymeric resin (*a polymeric binder*), a monomer having at least one polymerizable unsaturated bond in the molecule, and a photoinitiator (*a photoactive component*). Among the examples for the monomer having at least one photopolymerizable unsaturated bond in the molecule, Satoh includes (see col.6, lines

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53-67, col.7, lines 1-20) a *caprolactone-modified-2-hydroxyethyl acrylate* as well as *trimethylolpropane triacrylate* ("TMPTA" - Satoh actually uses this compound in its Example 1). Satoh furthermore teaches that the monomers can be used alone or in a *mixture of at least two*. Since Satoh clearly teaches that his monomers can be used in a mixture of at least two, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to use the mixture of two equal amounts (i.e., 1:1 mixture) of caprolactone-modified-2-hydroxyethyl acrylate and TMPTA as Satoh's monomer having at least one photopolymerizable unsaturated bond in the molecule with a reasonable expectation of obtaining a colored image forming material having considerably improved dispersion stability of pigment and photosensitivity. According to present specification (pg.13, last paragraph, pg.14, lines 1-10, pg.14, last paragraph, pg.15, lines 1-6), the combination of TMPTA (a triacrylate crosslinking agent) and the caprolactone-modified 2-hydroxyethyl *acrylate* (non-crosslinkable acrylate monomer) is a preferred example for the present curing agent system having the net acrylate functionality of about 2. Therefore, Satoh's teaching would render obvious present inventions of claims 16-20. Since the prior art teaches present step cited in present claim 16, it is the Examiner's position that the prior art's step would inherently enhance the removal of its photosensitive composition from its support material.

Allowable Subject Matter

13. Claims 4 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of

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the base claim and any intervening claims and also if the objections addressed in Paragraphs 2 and 4 above are overcome. Yamazaki et al do not teach or suggest any of those listed compounds in claims 4 and 12.


14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is (703) 305-0504. The examiner can normally be reached on Monday-Friday from 8:30 am EST to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Janet Baxter, can be reached on (703) 308-2303. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9311 for after final responses or (703) 872-9310 for before final responses.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0661.

S. J. Lee

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8/21/03


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